

REMARKS

The Examiner has rejected claims 1, 5, 8, 12, and 14 under 35 U.S.C. § 102(b) as being anticipated by JP 64-18460 to Ikeda (“Ikeda”). The Examiner has also rejected claims 2, 3, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Ikeda in view of U.S. Patent No. 5,144,342 to Kubota (“Kubota”). In addition, the Examiner has objected to claims 4, 6, 7, 9, 10, and 16-18 as being dependent upon a rejected base claim. However, Examiner has conceded that claims 4, 6, 7, 9, 10, and 16-18 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Examiner has allowed claims 13 and 19. Claims 6 and 7 have been amended to be in independent form. New claims 20-22 have been added which are ultimately dependent from Claim 13. Claims 3, 12, 13, 14, 15, and 19 have also been currently amended. Claims 1-2, 5, 8-10, 17, and 18 have been cancelled. Claim 11 had been previously cancelled. Thus, claims 3-4, 6-7, 12, 14-16, and 19-22 are currently pending. The following remarks are considered by applicant to overcome each of the Examiner's outstanding rejections to current claims 3-4, 6-7, 12, 14-16, and 20-22. An early Notice of Allowance is therefore requested.

I. SUMMARY OF RELEVANT LAW

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The determination of obviousness rests on whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. In determining obviousness, four factors should be weighed: (1) the scope and content of the prior art, (2) the differences between the art and the claims at issue, (3) the level of ordinary skill in the art, and (4) whatever objective evidence may be present. Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. The Examiner carries the

burden under 35 U.S.C. § 103 to establish a prima facie case of obviousness and must show that the references relied on teach or suggest all of the limitations of the claims.

II. THE CURRENT OFFICE ACTION SHOULD NOT BE MADE FINAL

On page 7 of the current Office Action, as well as on the Office Action Summary sheet, the Examiner has indicated that the Office Action is final. However, not a single of the Examiner's rejections from the prior Office Action of July 10, 2006, has been repeated. All of the Examiner's current rejections include new pieces of cited art, namely Ikeda and Kubota. While certain claims were amended in the Response to the previous Office Action, “[a] second or any subsequent action on the merits in any application or patent involved in reexamination proceedings should not be made final if it includes a rejection, on prior art not of record, of any claim **amended to include limitations which should reasonably have been expected to be claimed.**” MPEP, § 706.07(a) (emphasis added). In this case, the claim amendments should reasonably have been expected, as they are to what the specification referred. Accordingly, Applicant respectfully requests that the Examiner withdraw the final status of the current Office Action.

III. REJECTION OF CLAIM 14 UNDER 35 U.S.C. § 102(b) BASED ON IKEDA

On page 2 of the current Office Action, the Examiner rejects claims 12 and 14 under 35 U.S.C. § 102(b) as being anticipated by Ikeda. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Amended Claim 12 is now dependent from Claim 3. Therefore, the Examiner's rejection of Claim 12 will be discussed later along with the Examiner's rejection of Claim 3. Therefore, this section will only discuss the Examiner's rejection of Claim 14.

Claim 14 states, in part:

“wherein the apparatus further comprises a driver circuit which drives the actuator unit in a single driving mode in which the driver circuit thoroughly simultaneously applies respective equal electric voltages to said at least two active portions of an arbitrary one of the plurality of groups so as to thoroughly simultaneously deform said at least two active portions and thereby change the volume of said corresponding pressure chamber, and which does not drive the actuator unit in any modes different from said single driving mode.”

Applicant respectfully asserts that Ikeda fails to disclose the above claim language. In particular, Ikeda never discloses “a driver circuit which drives the actuator unit in a single driving mode in which the driver circuit simultaneously applies respective equal electric voltages to said at least two active portions ... and which does not drive the actuator unit in any modes different from said single driving mode.”

Examiner asserts that Fig. 5c of Ikeda discloses the above language of Claim 14. However, Examiner takes Fig. 5c out of context. Fig. 5c is only one step in the multi-step process of Ikeda as described in Figs. 5a-5e. The sequence of these figures displays that the driving force at times applies an electric voltage to only one active portion (see Figs. 5b and 5d). Clearly, Figs. 5b and 5c discloses a driving mode in which the driver circuit does not simultaneously apply respective equal electric voltages to two active portions. However, Claim 14 clearly states that the driver circuit “does not drive the actuator unit in any modes different from said single driving mode.” Accordingly, Figs. 5a-5e do not disclose a driver circuit as specified in Claim 14.

Claim 14 recites that the apparatus comprises a driver circuit which drives the actuator unit in a single driving mode in which the driver circuit thoroughly simultaneously applies respective equal electric voltages to said at least two active portions of an arbitrary one of the plurality of groups so as to thoroughly simultaneously deform said at least two active portions and thereby change the volume of said corresponding pressure chamber, and which does not drive the actuator unit in any modes different from said single driving mode. The expression that “the driver circuit thoroughly simultaneously applies respective equal electric voltages to said at least two active portions of an arbitrary one of the plurality of groups” means that the

driver circuit applies a common drive signal, i.e., a common drive waveform to said at least two active portions of the arbitrary group.

On the other hand, regarding the rejection to Claim 14, the Examiner refers, in the last paragraph of page 4 of the Office Action, to Fig. 4, Fig. 5, step c, and page 6 of Ikeda. Ikeda discloses, in Fig. 5, step a, an inkjet printer head including a fluid (ink) channel 11 having a fluid inlet (an ink-supply port) 15 and a fluid outlet (an ink-ejection nozzle) 16, and two independent piezoelectric bimorph sections 13, 14 each of which is partially fixed and is provided in the fluid channel 11. However, a pump to flow the fluid in a constant direction is formed by shifting the time of driving said independent bimorphs 13, 14. See the English abstract of Ikeda. That is, the time of driving the two independent bimorphs 13, 14 is shifted as shown in Fig. 4. Fig. 4 shows a first drive waveform V1 to be applied to the first bimorph 13 provided near the inlet 15, and a second drive waveform V2 to be applied to the second bimorph 14 provided near the outlet 16. Thus, the two bimorphs 13, 14 are driven independent of each other by the two different drive waveforms V1, V2, such that the two bimorphs 13, 14 are only partly simultaneously driven but are not thoroughly simultaneously driven, as shown in the graph of Fig. 4 of Ikeda. Therefore, we observe that the subject matter of Claim 14 is not anticipated by Ikeda, and respectfully traverse the Examiner's rejection to Claim 14 under 35 U.S.C. 102(b) over Ikeda.

Claim 14 also states, in part:

“a channel unit having a plurality of pressure chambers which communicate, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply manifold and, at respective second ends thereof, with respective nozzles so as to eject respective droplets of the liquid through the respective nozzles...”

Applicant respectfully asserts that Ikeda fails to disclose the above claim language. In particular, Ikeda never discloses “a channel unit having a plurality of pressure chambers” or “a liquid supply manifold” as specified in Claim 14.

Examiner asserts that Fig. 1, element 11 of Ikeda discloses a channel unit having a plurality of pressure chambers. However, element 11 is itself only a single pressure chamber. In fact, Ikeda describes element 11 as a single “fluid channel 11”. Accordingly, element 11 does not disclose multiple pressure chambers, let alone a channel unit as specified in Claim 14.

Examiner asserts that Fig. 1, element 17 of Ikeda discloses a liquid supply manifold. However, element 17 is a single “fluid supply path 17”. Dictionary.com defines a manifold, in the context of machinery, as “a chamber having several outlets through which a liquid or gas is distributed or gathered.” Dictionary.com Unabridged (v 1.1). Random House, Inc., 06 Mar. 2007, <http://dictionary.reference.com/browse/manifold>. Ikeda only ever discloses one fluid outlet for fluid supply path 17. Therefore, fluid supply path 17 cannot possibly disclose a liquid supply manifold as stated in Claim 14.

Since Ikeda fails to disclose both a channel unit and a liquid supply manifold, as well as a driver unit, as stated in Claim 14, Applicant respectfully asserts that Examiner has failed to establish a *prima facie* case of anticipation of independent Claim 14. Therefore, Applicant respectfully asserts that the Examiner remove the rejection of Claim 14 under 35 U.S.C. § 102(b) as being anticipated by JP 64-18460 to Ikeda.

IV. REJECTION OF CLAIMS 3, 12, AND 15 UNDER 35 U.S.C. § 103(A) BASED ON IKEDA IN VIEW OF KUBOTA

On page 5 of the current Office Action, the Examiner rejects claims 2, 3, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Ikeda in view of Kubota. Claim 12 has been amended to depend from Claim 3. Therefore, the Examiner’s rejection of Claim 12 will also be addressed in this section. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Claim 3 states, in part:

“when the two active portions are elongated in the direction of thickness of the common piezoelectric sheet, **an intermediate**

portion of the common piezoelectric sheet that is located between the two active portions is elongated in a same direction as the direction of elongation of the two active portions.”

Applicant respectfully asserts that Ikeda fails to disclose the above claim language. In particular, Ikeda never discloses “an intermediate portion of the common piezoelectric sheet that is located between the two active portions is elongated in a same direction as the direction of elongation of the two active portions.”

Examiner asserts that Figs. 5b-5d of Ikeda disclose the above language of Claim 3. However, Examiner misinterprets Figs. 5b-5d. As can be clearly seen in Figs. 5a-5e, the portion of the piezoelectric sheet that is located between bimorphs 13 and 14 (the elements asserted by Examiner to disclose the two active portions) never elongates in the direction of thickness of the common piezoelectric sheet. This is because the end of the bimorph 13 that is nearest to the fluid supply port 15 bends while the end of the bimorph 13 that is farthest from the fluid supply port 15 remains stationary. Similarly, the end of the bimorph 14 that is nearest to the fluid ejection port 16 bends while the end of the bimorph 14 farthest from the fluid ejection port 16 remains stationary. Thus, the portion of the piezoelectric sheet that is located between bimorphs 13 and 14 (the portion between the end of bimorph 13 that is farthest from the fluid supply port 15 and the end of bimorph 14 that is farthest from the fluid ejection port 16) also remains stationary. Thus, Ikeda does not disclose “an intermediate portion of the common piezoelectric sheet that is located between the two active portions is elongated in a same direction as the direction of elongation of the two active portions.” Accordingly, Ikeda fails to disclose the above described language of Claim 3. Moreover, Kubota also fails to disclose the above claim language, and the Examiner never contends otherwise.

Regarding the rejection to Claim 3, the Examiner first refers to Fig. 1, elements 13, 14, Fig. 5, steps b-d, and page 6 of Ikeda. However, first, we observe that each of the two piezoelectric bimorph sections 13, 14 of Ikeda is not elongated in the direction of thickness thereof, but is just bent in one direction, e.g., downwards direction as shown in Fig. 5, steps b-d.

In addition, an intermediate portion of a common piezoelectric sheet that is located between the two bimorph sections 13, 14 of Ikeda is not deformed in any directions, even bent in the same direction as the direction of bending of the two dimorph sections 13, 14, as shown in Fig. 5, steps a-e, because a bimorph element functions such that only a free end portion thereof is bent by piezoelectric effect whereas a base end portion thereof is kept stationary. As shown in Fig. 2, step c, respective base portions of two piezoelectric green bodies corresponding to the two bimorph sections 13, 14 are continuous with each other via an intermediate portion located therebetween. However, when each of the two bimorph sections 13, 14 is deformed, i.e., bent in one direction, the intermediate portion located between the two bimorph sections 13, 14 is not deformed in any directions.

Second, the Examiner refers to column 1, lines 11-15, column 4, lines 51-57, and column 2, lines 34-36 of the secondary reference to Kubota. Kubota discloses, in Fig. 5, an ink-jet printer head including two piezoelectric elements 33a, 33b each of which serves a piezoelectric vertical effect, i.e., selectively expands and contracts in the direction indicated by an arrow C which is parallel to the electric field. However, like Ikeda, Kubota does not teach or suggest that an intermediate portion of a common piezoelectric sheet that is located between the two piezoelectric elements 33a, 33b of Kubota is elongated in the same direction as the direction C of elongation of the two elements 33a, 33b. Kubota's two piezoelectric elements 33a, 33b do not have even a common piezoelectric sheet.

Therefore, we observe that the subject matter of Claim 3 (or dependent claim 15, or claim 12 amended to depend from claim 3) is not rendered obvious over Ikeda even in view of Kubota, and we respectfully traverse the Examiner's rejection to claims 3 and 15 (and to claim 12) under 35 U.S.C. 103(a) over Ikeda and Kubota.

Claim 3 also states, in part:

"a channel unit having a plurality of pressure chambers which communicates, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply

manifold and, at respective second ends thereof, with respective nozzles so as to eject respective droplets of the liquid through the respective nozzles..."

Applicant respectfully asserts that Ikeda fails to disclose the above claim language. In particular, Ikeda never discloses "a channel unit having a plurality of pressure chambers" or "a liquid supply manifold" as specified in Claim 3.

Examiner asserts that Fig. 1, element 11 of Ikeda discloses a channel unit having a plurality of pressure chambers. However, element 11 is itself only a single pressure chamber. In fact, Ikeda describes element 11 as a single "fluid channel 11". Accordingly, element 11 does not disclose multiple pressure chambers, let alone a channel unit as specified in Claim 3.

Examiner asserts that Fig. 1, element 17 of Ikeda discloses a liquid supply manifold. However, element 17 is a single "fluid supply path 17". Dictionary.com defines a manifold, in the context of machinery, as "a chamber having several outlets through which a liquid or gas is distributed or gathered." Dictionary.com Unabridged (v 1.1). Random House, Inc., 06 Mar. 2007, <http://dictionary.reference.com/browse/manifold>. Ikeda only ever discloses one fluid outlet for fluid supply path 17. Therefore, fluid supply path 17 cannot possibly disclose a liquid supply manifold as stated in Claim 3.

Accordingly, Applicant respectfully asserts that Examiner has failed to establish a *prima facie* case of obviousness of Claim 3, and corresponding claims 12 and because they are dependent from Claim 3. Therefore, Applicant respectfully asserts that the Examiner remove the rejection of claims 3, 12, and 15 under 35 U.S.C. § 103(a) as being unpatentable over JP 64-18460 to Ikeda in view of U.S. Patent No. 5,144,342 to Kubota.

V. REJECTION OF CLAIMS 4, 6, 7, AND 16 AS BEING DEPENDENT UPON A REJECTED BASE CLAIM

On page 7 of the current Office Action, the Examiner objects to claims 4, 6, 7, 9, 10, and 16-18 as being dependent upon a rejected base claim. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Claim 4

Claim 4 is dependent from Claim 3. As Claim 3 is allowable, so must be Claim 4. Therefore, Applicants assert that Claim 4 is now in allowable form, and respectfully request that Examiner remove the objection to Claim 4 as being dependent upon a rejected base claim.

Claims 6, 7, and 16

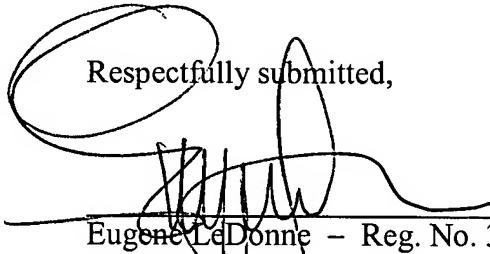
Claims 6 and 7 have been amended to be in independent form. Accordingly, Applicant asserts that claims 6 and 7 are now in allowable form. Claim 16 is dependent from Claim 7. As Claim 7 is allowable, so must be Claim 16. Therefore, Applicant also asserts that Claim 16 is now in allowable form.

VI. NEW CLAIMS 20-22

New claims 20-22 are ultimately dependent from Claim 13. As Claim 13 is allowable, so must be Claims 20-22. Therefore, Applicant respectfully asserts that claims 20-22 are in allowable form.

Based upon the above remarks, Applicant respectfully requests reconsideration of this application and its early allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,


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